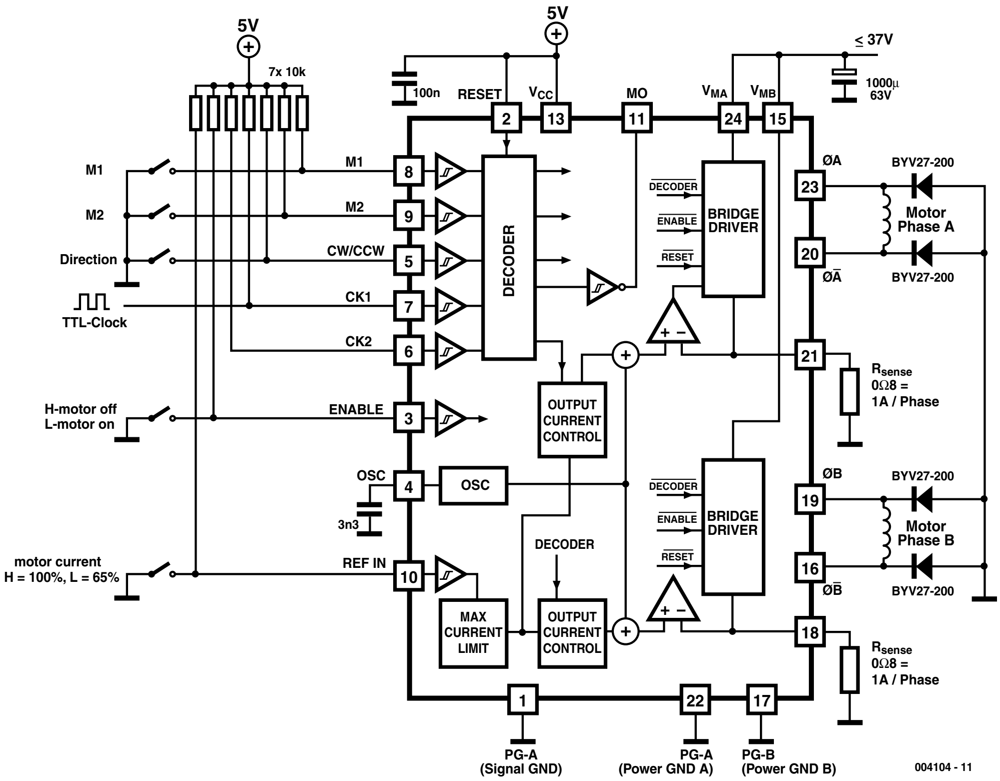
# 045 Stepper Motor Microstep Driver



004104 - 11

**Table 1. Step settings**

| Input |  | Mode |
|---|---|---|
| M1 | M2 |  |
| L | L | 1/1 step |
| H | L | ½ step |
| L | H | ¼ step |
| H | H | ⅛ step |

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**from a Nanotec application note**

The IMT 901 IC from the German firm Nanotec makes it easy to build a stepper motor controller. You can find a data sheet with complete technical specifications at the Nanotec site (*http://nanotec.de*).

The circuit diagram can be kept very simple. In the application shown here, the IC is controlled manually, but it can naturally also be controlled by a microcontroller or PC. Signals M1 and M2 select the number of current steps for each mechanical step (see **Table 1**). Bear in mind that the more current steps there are, the more clock pulses are needed to move the motor by one step. In other words, with more current steps the motor will run more slowly at the same clock rate.

The motor current is set by the resistor $R_{sense}$. The desired current level naturally depends on the motor used. The value of R is given by

R = 0.8 ÷ (desired current in ampère)

Use a 5-W resistor. The IC will limit the motor current to this value using pulse-width modulation. The IC runs from a 5-V supply. The two supply voltages on $V_{MA}$ and $V_{MB}$ must be equal to the specified voltage for the motor used (in practice, at most 37 V).

(004104-1)

**IMT 901 specifications**

| Parameter | Value |
|---|---|
| Supply voltage $V_{CC}$ | 5.5 V |
| Supply voltage $V_M$ | 40 V |
| Output current $I_{out}$ | 1.5 A (average)<br>2.5 A (peak) |
| Power dissipation $P_d$ | 4 W (no heat sink)<br>40 W (with heat sink)<br>$T_c$ = 85 °C |
| Operating temperature | –40 to +85 °C |
| Storage temperature | –55 to +150 °C |

| INPUT |  |  |  |  | MODE |
|---|---|---|---|---|---|
| CK1 | CK2 | CW/CCW | $\overline{\text{Enable}}$ | $\overline{\text{Reset}}$ |  |
| ↑ | H | L | L | H | CW |
| ⎍ | L | L | L | H | INHIBIT |
| H | ↑ | L | L | H | CCW |
| L | ⎍ | L | L | L | INHIBIT |
| ↑ | H | H | L | H | CCW |
| ⎍ | L | H | L | H | INHIBIT |
| H | ↑ | H | L | H | CW |
| L | ⎍ | H | L | H | INHIBIT |
| X | X | X | H | H | Z |
| X | X | X | X | L | Z |

004104- 12